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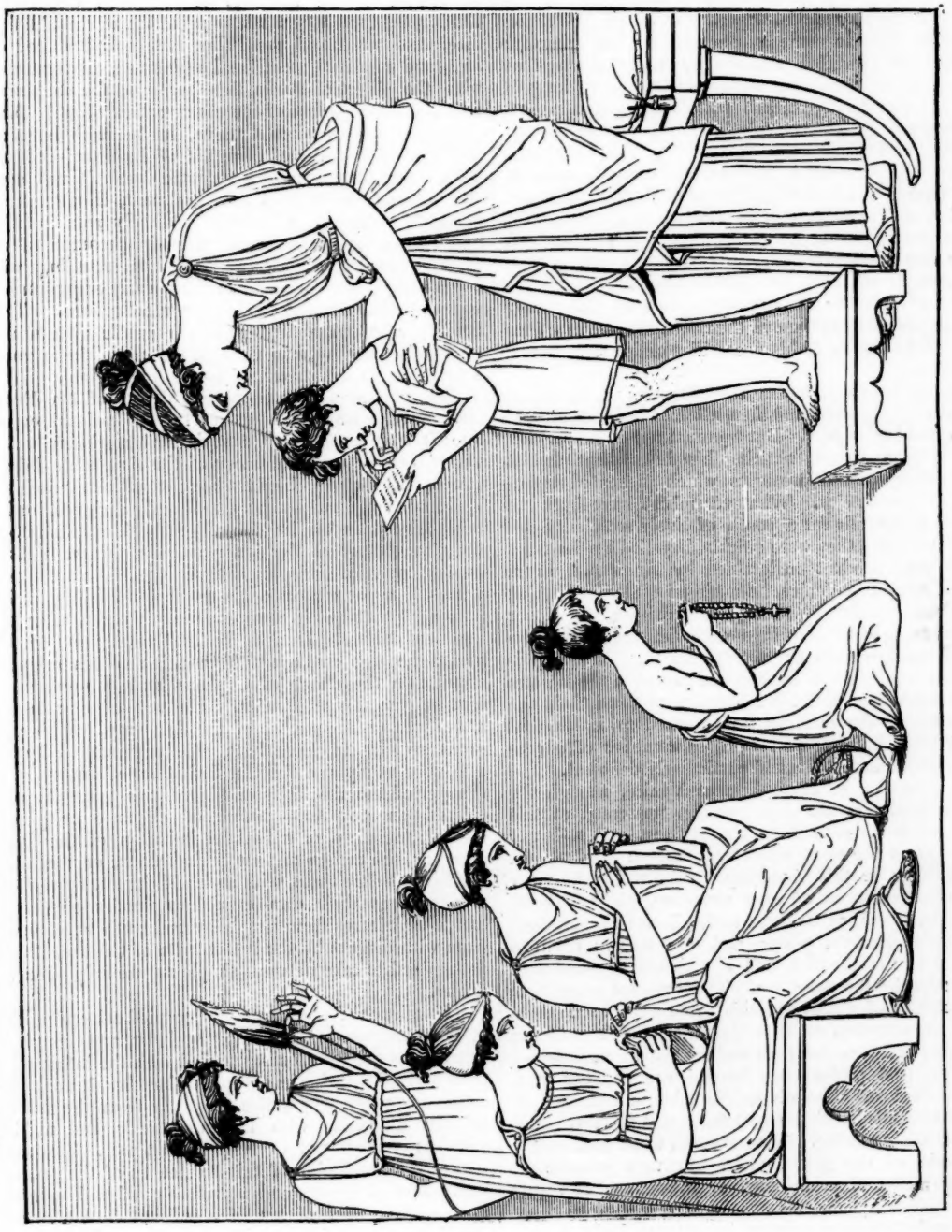


INSTRUCTION. FROM A BASSO RELIEVO BY CANOVA.

CANOVA AND HIS WORKS.

II.

WE left our young artist at that period of his history when his eager aspirings after distinction in his profession were encouraged by the invitation of his benevolent patron, the senator Falier, to repair immediately to Venice. The reception he met with at the Falier palace was most kind and hospitable, and he thus found himself, at the age of fifteen, in a situation which opened a new and ample field for observation and improvement. The love of independence, which had ever strongly marked the character of Canova, would not, however, permit him to be entirely dependent on the bounty of others. He justly considered himself sufficiently advanced in the mechanical department of his profession to entitle him to some recompense in labouring for another; he therefore resolved to engage himself as assistant to some eminent master, and was not long in entering into an agreement with *Giuseppe Ferrari*, the nephew, or grand-nephew, of his former friend Toretto, and sometimes known by that surname. Canova engaged, for a very slender consideration, to work during the latter half of each day for Ferrari. "I laboured," says Canova, in a letter to a friend, "for a mere pittance,—but it was sufficient. It was the fruit of my own resolution; and, as I then flattered myself, the foretaste of more honourable rewards, for I never thought of wealth." It is evident, therefore, that, young and inexperienced as Canova then was, his own exertions did in part minister to his necessities on his first arrival at Venice.

Canova remained under the direction of Giuseppe Ferrari nearly a year, and then left his employment, and became his own master. But we must not pass over his space of time without noticing his deportment amidst the novelties and allurements which presented themselves in a great city. Whatever might have been the fears of his friends for a youth of lively sensibility and little experience, they were quickly dispelled by the strict propriety of conduct maintained by Antonio. From his first arrival in Venice, he made an exact distribution of his time, and allotted to each division its proper employment. The mornings were devoted to the studies of the Academy, or to those of the *Farsetti* gallery; the latter part of the day was passed in the labours of the workshop; and after these were concluded, the remainder of the evening was allotted to intellectual pursuits, and improvement in those branches of education in which he felt himself particularly deficient.

The Academy of Fine Arts at Venice, though far inferior to what it has since become, possessed at this time some good casts from the antique, and a larger number from the most celebrated modern productions. The students in this Academy were directed in their studies by professors of some eminence. The Farsetti gallery, in which, as we have said, Canova also studied, was in the Farsetti palace, and was thrown open to students in the fine arts, and abundantly supplied with every requisite for their use. The constant attendance and assiduity of Canova at this place were such as to attract the attention of the noble owner, and from thence the young artist received his earliest commission, which led to the first performance for which money was paid. This earliest of Canova's public labours consisted of two baskets filled with different fruits and flowers, sculptured in white marble. They are still to be seen on the balustrade of the grand stair, but they present no striking marks of proficiency, or indications of future talent.

An undertaking of greater importance had for some time occupied his leisure hours. This was commenced at the instigation of Falier, and was to comprise a group on the subject of Orpheus and Eurydice. The model for the statue of Eurydice was first executed, and as the Falier family were about to leave town, for their usual summer retreat at Asola, Canova accompanied them, carrying with him everything necessary for the completion of that part of his work. At the Villa Falier, therefore, was Canova's first statue completed, when he was in his sixteenth year. It was executed in *pietra di Costa*, a species of soft stone, found near Vicenza. Canova is said to have been but little satisfied with this first effort; but his Eurydice was generally applauded as a work of great merit, and gave so much satisfaction to his patron that the young sculptor was declared sufficiently instructed in his profession to present himself, without fear, on the public stage of life. We may here relate a pleasing anecdote, illustrative of the kindness of Canova's disposition. During the time he was labouring at the statue of Eurydice, a domestic of the Falier family had waited on him, and rendered occasional assistance, in connexion with the object of study, thus becoming for the time a friend and companion of the young artist. Nearly forty years afterwards, when Canova, loaded with honours, and bearing the title of Marquis of Ischia, visited the Villa Falier, he recognized the same domestic, now aged and infirm, as he entered the apartment, in attendance upon the company. Canova immediately rose from his seat, and going up to the old man, in presence of the assembly, most cordially embraced him, recalling with delight every little incident of their early acquaintance, and suggesting many endearing recollections. True nobility of mind, united with the gentle virtues was remarkably displayed in Canova, and made him as much beloved as his talents caused him to be admired.

But we must return to the completion of his Eurydice, and the commencement of his professional career on his own account. Canova's first workshop was a vacant cell in the monastery of the Augustine Friars, attached to the church of St. Stefano, which through the kindness of the monks was gratuitously assigned for his use. There, in an indifferently lighted apartment, on the ground-floor of the inner cloister, Canova worked industriously for the space of four years. An apartment was still appropriated to his use in the dwelling of his patron, so that he did not remain in his cell after the hours of labour. During the first three years of this period he was employed, in addition to his ordinary studies, on the statue of Orpheus, and in executing a bust of the *Doge Renier*. He was regular in his attendance on the studies of the Academy, but his progress appears to have been chiefly promoted by his assiduous study and faithful imitation of nature. At this period the simplicity of nature was generally considered as poverty,—devoid of elegance or grace: instead, therefore, of a faithful imitation of the object of study, the artists of that period drew, or modelled, the figure before them, with such additions or corrections of nature as their own capricious fancies suggested. These departures from simplicity and truth were turned from with disgust by the better taste of Canova, and he determined to take nature—simple nature only—for his model.

The science of anatomy now occupied a large portion of the attention of our young sculptor, and though he was at first obliged to rest satisfied with the information to be derived from books and public lectures, it was afterwards his constant practice to study from the human subject, dissecting with his own hands, and making sketches or models of every important part. He justly regarded a knowledge of this science as of the greatest importance to his art, and therefore continued to study it to a late period of his life. His profession so constantly engaged his thoughts that even when walking in the streets, where that exercise could be enjoyed in Venice, he was always ready to mark whatever he saw that was interesting in expression, or striking in attitude. "He would often stop before the workshop of some

artisan, to remark the forceful yet easy position into which the body was thrown in different occupations." His steps were frequently arrested, as he traversed the long succession of wharfs which formed a favourite place of exercise to him, to observe with admiration the well-formed trunk or sinewy limbs of a porter in powerful exertion. Yet so much did he love simplicity, that, on being observed by those who had been the objects of his contemplation, he immediately passed on, knowing that his attentive regard would produce constraint in their actions. Appearances, thus hastily caught, were so cleverly retained, and fixed by the sculptor in his mind, that when his subject required it he could make use of them in a way seldom perceived in the artificial and studied positions of academical figures. His application was at this period unremitting; and none could witness such unwearied exertions, united with so much talent, without anticipating for our artist a high degree of future excellence and eminence. Nor did he, while closely engaged in studies immediately connected with his profession, pass by in disregard those collateral branches of knowledge which might give correctness to the subordinate embellishments of sculpture. To use the words of his friend, the younger Falier,—"He knew how to instruct himself in every kind of information connected with literature and the arts, at the very moment when his heart and hand were occupied with such exquisite address in giving to marble life and movement." He studied ancient and modern history, especially the former. Through the medium of translations, he became acquainted with most of the classic writers of Greece and Italy; he was well read in works of antiquity, taste, and the philosophy of the arts, and is said to have been well acquainted with the Spanish and French languages. Respecting the former there appears some doubt, but the latter he studied with assiduity, and spoke with fluency and elegance.

This general plan of professional study was followed by Canova during nearly seven years, three of which had now elapsed since the production of his statue of Eurydice. As might have been expected, the progress in knowledge and experience of the artist, was strongly marked in the completion of the group. His Orpheus which now appeared, was evidently superior to its companion, and exhibited wonderful correctness, with the utmost simplicity and closest imitation of nature. It was wrought in soft stone, but the execution was such that it might easily have been taken for marble tinted by age. There was a custom at Venice for such artists as had recently finished any meritorious performance, to exhibit it publicly in the square of St. Marks, at the annual festival of the Ascension. Induced and encouraged by his friends, Canova so far overcame his natural diffidence as to present here his statue of Orpheus. As this was his first attempt to bring himself into public notice, his feelings were proportionably agitated; but his apprehensions as to the result of this step, were soon dissipated. Though the style of his production was altogether different from that which was generally followed at that period, yet the simplicity and truth conspicuous in it, called forth the approbation of every person of genuine taste and feeling, while the obscurity of the author shielded him from the envy of rivals.

From this period, 1776, must be dated the commencement of Canova's success and reputation. The approbation bestowed on the Orpheus, by the Venetian public, was ever gratefully remembered by Canova, as that which made him a sculptor. After an interval of many years, on reading a letter which had been written at this period and in which his success was recorded, he appeared greatly affected, and exclaimed, "*O cari amici! O grati tempi! quindi sono divenuto scultore.*" (O dear friends! O delightful times! by these have I been rendered a sculptor.) Nearly half a century after this period, and when his fame stood so high that we might almost expect him to forget the circumstances relating to his first group, he shewed his gratitude to his early patron by adopting, when Marquis of Ischia, the armorial bearings of the *serpent* and *lyre*, the mythological symbols of Orpheus and Eurydice. "In my armorial bearings," he writes to the younger Falier, "I have adopted the emblems of Orpheus and Eurydice in memory of these my first two statues, ordered of me by your most estimable father, from which statues I ought to acknowledge the commencement of my own civil existence."

After the exhibition of the Orpheus, Canova found his professional employment rapidly increase. The senator, Grimani, ordered a copy of that statue, in smaller dimensions, which was completed about a year after the former, in Carrara marble. The accommodation afforded to our artist by the kind monks of St. Stefano was now found insufficient, and he therefore removed to a better-lighted studio in the street or lane *San Maurizio*, where he continued till his departure from Venice. The following year he produced his statue of *Esculapius* in proportions larger than life. This work was commissioned by the *Marchioness Spinola;* but from a change of circumstances, the lady was obliged to relinquish the contract; thereby causing serious inconvenience to the artist, who was long in finding another purchaser. Canova on seeing this statue in after years is said to have been greatly surprised at the taste and mechanical skill displayed in it, and to have regretted that, during half a century, his progress had not more nearly corresponded with these early indications of excellence.

The most important and celebrated production that had yet appeared, was completed in Canova's twenty-second year. This was the group of Dædalus and Icarus, executed in Carrara marble, at the request of the senator, *Pisani*, who designed it for a niche between the double entrance doors of the palace fronting the grand canal. Such was the beauty of the production, however, that it was deemed too valuable to be thus exposed, and was placed, with some *chefs d'œuvres* of the sister art, in an inner gallery of the palace. This group was the last work of importance executed by Canova, at Venice. Highly as his merits were now estimated in that city, he felt that it did not present a field for the exercise of his abilities, nor afford the means of more extensive and refined acquirements. He therefore resolved to repair to Rome and to attempt an establishment there. To aid this enterprise, his friends petitioned the Venetian state for a pension, that he might be thus enabled to prosecute his studies without embarrassment. Canova did not wait the result of their endeavours in his behalf, but leaving this affair in their hands, set out for the banks of the Tiber.

Among the numerous productions of our artist, the specimens of his skill in basso-relievo must not be overlooked. Our frontispiece represents one of these, being a pleasing group illustrative of the benevolent offices of Instruction.

The bassi-relievi of Canova frequently represent the figures of the natural size, and though exhibiting great beauty of form, delicacy of finish, and precision of outline, are said to be often deficient in strength, from the degree of relief being disproportionate to their dimensions. They have been compared to a fine picture, where the light is too equally diffused over the whole surface without the just equivalent of shade. "In lines of such extent," says Memes, "it would have been well if the contours, instead of losing themselves in the plain of the tablet, had been rounded off to a certain altitude; then cut square, as in many of the most admired relievos of antiquity: a bolder, firmer, and deeper shadow is thus cast, and a more vigorous effect produced."

CALCULATING MACHINES.

III. BABBAGE'S CALCULATING ENGINE.

IN the present paper we shall finish our notice of calculating machines, by referring to Mr. Babbage's engine, and in doing so we shall consider, first, the necessity for such a machine,—secondly, the mathematical principle on which it is constructed,—and, thirdly, the sort of mechanism by which it performs its office.

1. Persons whose avocations require the constant aid of arithmetical or other tables are liable to be led into frequent and increasing error, unless those tables be rigorously correct. In the navigation of a ship, or in the preparation of an almanac, for instance, tables are employed to an extent inconceivable by those to whom such employments are foreign; and in the higher branches of astronomy the extent of the use of tables is still greater. Now these tables, being the work of human heads and hands, are liable to all the defects incident to such productions; and it is accordingly found that every table which has been yet published has been disfigured by error of more or less magnitude. Tables of multiplication, of powers and roots, of trigonometrical elements, of logarithms, of the solar, lunar, and planetary motions, &c., have been computed and published in various countries, to the extent of many hundred volumes; and, notwithstanding the extraordinary care which has often been bestowed on their preparation, there is scarcely one of them free from error, more or less. In a multiplication table, (as far as 100 times 1000,) constructed by Dr. Hutton for the Board of Longitude, forty errors were discovered on one single page, taken at random. In the solar and lunar tables from whence the computations were formerly made for the Nautical Almanac, more than five hundred errors were found by one person. In the "Tables requisite to be used with the Nautical Almanac" more than one thousand errors were detected by a single individual. In certain tables, published by the Board of Longitude, a table of errata, containing eleven hundred errors, was affixed! It was afterwards found necessary to have an errata of the errata!! and one instance has been known of an erratum of the errata of the errata!!!

Now such a mass of error seriously affects the computations into which these tables enter, and it is of course desirable to devise the means of diminishing the amount of such error. But the sources of error are so numerous that it is difficult to counteract or remedy them all; for instance, some result from falsely computing, and others from falsely transcribing; some from the compositor taking wrong types, and others from a displacement of the types, by the inking-ball used by the printers, and then by a faulty replacement of such types by the pressman. Mr. Babbage himself published a set of logarithmic tables, in which, notwithstanding a degree of care which had perhaps never before been bestowed on such a subject, errors were detected, even after the tables were stereotyped.

2. These circumstances, amounting almost to an impossibility of producing correct tables by the common method, led Mr. Babbage, about twenty years ago, to devise a mode of computing and printing off mathematical tables by a machine; for it was found that, however correct the computation might have been, errors of the press would always exist under the common method. Nearly all tables, such as logarithms, squares, cubes, square roots, cube roots, sines, tangents, &c., consist of numbers which either increase or decrease, according to some general law, and it is therefore for the most part found that, whatever be the nature of the table, it can be computed by a continued series of *additions*, so as to come within the scope of mechanical action. The formation of tables by a constant succession of additions depends on a mathematical property, called the *method of differences*, which we must endeavour briefly to explain.

Let us take a series of square numbers, that is, the squares of the natural numbers, beginning from 1.

Nos.	Squares.	1st. Diff.	2nd. Diff.
1	1		
		3	
2	4		2
		5	
3	9		2
		7	
4	16		2
		9	
5	25		2
		11	
6	36		

There results the series of squares 1, 4, 9, 16, 25, 36. Subtract each number from the one next below it, that is, 1 from 4, 4 from 9, &c., and there results the series 3, 5, 7, 9, 11, called 1*st differences*. Again, subtract each one of these last obtained numbers from the one next below it, and we shall obtain the constant number 2. called 2*nd differences*. Now it is found that in almost every table, consisting of numbers increasing or decreasing according to some general law, we can arrive at a *constant* difference, by continual subtraction. Here is another example, which is a short table of the cubes, or 3*rd* powers of numbers:—

Nos.	Cubes.	D^1	D^2	D^3
1	1			
		7		
2	8		12	
		19		6
3	27		18	
		37		6
4	64		24	
		61		6
5	125		30	
		91		6
6	216		36	
		127		6
7	*343		*42	
		169		*6
8	512		48	
		217		
9	729			

By subtracting the cubes successively one from another, we get a series of numbers forming the 1st order of differences. By subtracting similarly the terms of this series, we obtain another series, forming the 2nd order of differences, and, by proceeding in like manner a third time, we come at length to a 3rd order of differences, in which the terms are all equal, and which is the constant difference. Something more or less analogous to this will occur in almost all tables increasing or decreasing according to a certain law, and we can now show how these differences enable us to arrive at the successive terms of a table, by mere addition. For instance, having ascertained in the preceding table that the constant difference is 6, that there are three orders of differences, and that their first terms are 6, 12, and 7 respectively, we can construct the 2nd differences by adding 6 to 12, and then 6 to this sum, time after time. Then the 1st differences may be obtained by adding the terms in the 2nd differences to 7, term by term, and so on until we at length arrive at the required numbers, nothing being necessary throughout but a continual process of addition. In some tables it is found that we arrive at a column of differences which remains constant for a certain number of terms, and then acquires a slight increase or decrease; but even in such a case, a periodical change of the constant difference will be all that is necessary.

Mr. Babbage, after carefully considering the various properties of numbers, selected this one, viz., the method of differences, as the basis of his machine; since, after having given the few early terms of a series, and the first term of each of the several orders of differences, the subsequent construction of the table depends wholly on a continued succession of additions, a process which is more readily within the power of machinery than any other. In fact, as exemplifying the necessity for such a machine, in order to insure accuracy in the unceasing and monotonous operations of addition, we will relate a curious but well-known fact.

During the time of the French republic, it was decided

upon by the government of that country, to construct a vast system of logarithmic and trigonometric tables, such as did not then exist, and which might serve as a store of calculation for ever. M. Prony, who was appointed to preside over this undertaking, adopted with success the useful principle of the division of labour. He distributed the persons engaged in this undertaking into three sections: the first consisted of half-a-dozen of the most eminent analysts, whose duty it was to investigate the most convenient mathematical formulæ, which should enable the computers to proceed with the greatest expedition and accuracy by the method of differences. These formulæ, when decided upon by the first section, were handed over to the second, which consisted of about ten properly qualified mathematicians. It was the duty of this second section to convert into numbers certain general or algebraical expressions which occurred in the formulæ, so as to prepare them for the computers. They were then given to the third section, who formed a body of nearly a hundred computers, whose office it was to make up the numbers, finally intended for the tables, and those, who in this case committed fewest errors, were those who understood nothing but mere addition! This shows that, as such persons were little better than machines, so a regular machine would achieve its work one degree better, that is, by ensuring perfect accuracy.

The body of tables thus calculated, contained in manuscript seventeen folio volumes, but were never published. The printing of them was commenced, and a small portion was actually stereotyped: but soon after the commencement of this undertaking, the sudden fall of the assignats, rendered it impossible for the printer to fulfil his contract with the government. The British government offered 5000*l.* towards the completion of this work, but political circumstances perhaps prevented its re-adoption, and it has never been resumed.

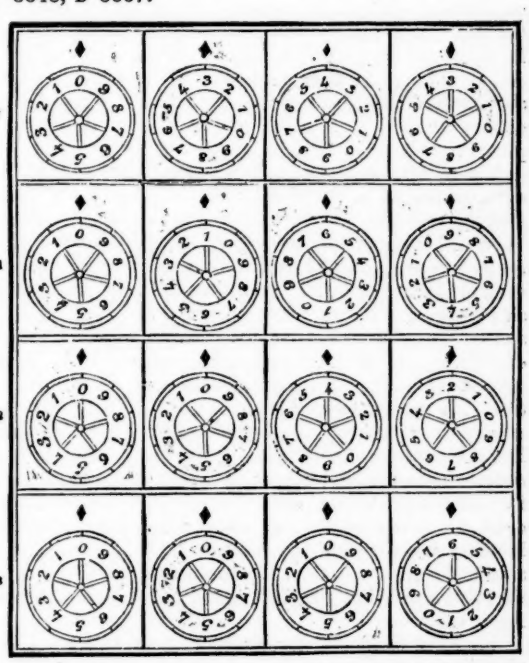
3. The fact, therefore, stands clear, that persons who knew only addition, worked throughout *nearly* correct; and that a machine, which acts only by performing addition, is throughout *quite* correct. We therefore now proceed to take a cursory glance of the mechanism of Mr. Babbage's machine.

He provided as many dial-faces as there were orders of differences, plus the origial series, in the particular table which he desired to construct, multiplied by the number of figures, to which each term would extend: for instance, if, as we have supposed in the annexed figure, each term should extend to four places of figures, and if the series of terms had three orders of differences besides the original series itself, there would be sixteen dial-faces arranged in a square. Each dial is marked with the ten digits arranged round in a circle, and above each disc is a mark which serves as an index. Each dial is also fixed on the face of a wheel, whose circumference is either toothed, or provided with projecting pins which can be inserted into an adjoining wheel. The object to be attained then is to make the dials above any particular order of differences revolve, in proportion to the number contained in the order of differences next below it.

For the sake of illustration, we shall therefore suppose that the table to be calculated shall consist of numbers not exceeding two or three places of figures, and that the difference of the third order is the constant difference, as in the last preceding table. When the dials revolve, the numbers pass, as they increase, under the index over each dial, that is, from left to right.

Now we will suppose that the line D¹ is to be added to the line T. To effect this, the dials on the line D¹ remain still, while those on the line T are so moved, that as many divisions on each dial shall pass under its index, as there are units in the number at the index just below it. If 0 be at any index on D¹, the dial above it does not move. In like manner, the D² is added to the line D². When two figures added together make more than 9, a carrying of 1 has to be made; and the dial to the left is accordingly advanced one division: Hence, in order to prevent the machine from being burthened with more mechanism than is necessary, the additions are performed in two successive periods of time, and the carryings in two other periods of time, thus:—If one complete revolution of the axis, which moves the machinery, makes one complete set of additions and carryings, the *first* quarter of a turn of the axis will add the *second* and fourth rows to the first and third, without carrying, which will be effected by the *second* quarter of a turn. The *third* quarter of a turn will add the second and third rows together, and the *fourth* will carry if necessary.

In the miniature representation which accompanies this slight description, we will suppose a computation to have proceeded as far as the cube of 7 which is 343. This number appears therefore in the highest row, and the several differences, as far as the third, which is constant, are shown in the successive rows of dials beneath. In the last preceding table, which concurs with these dials, the differences alluded to, are marked; and by comparing the table with the dials it will be seen how the process goes on, and that, at the completion of one revolution of the axis of the machine, the row T will give 0512, D¹ 0217, D² 0048, D³ 0007.



The machine occupies a space about ten feet broad, ten feet high, and five feet deep. In the foregoing description we have, for the sake of clearness, somewhat varied from the actual mechanism. There are, in fact, seven vertical axes in front of the machine, each containing eighteen wheels, with their *edges* presented to the eye; and round the edge of every wheel the numbers from 0 to 9 are written. The eighteen wheels are for the purpose of carrying a computation as far as eighteen places of figures; and the seven wheels in width are for constructing tables which have as many as six orders of differences. Seven other axes are placed behind the front ones, and are mounted with wheels connected with the moving parts of the machinery. The dials are placed vertically one below the other, and read from top to bottom: their axes are vertical, and their planes horizontal. This arrangement saves space, and lessens the amount of friction. The wheels of the last column, which gives the constant difference, always remain still, and are of course adjusted by the hand, when the calculation of a new table is about to commence. When

anything goes wrong, or any new adjustment has to be made, the machinery rings a bell!

The reader would perhaps desire to learn, and we should be happy to describe, were it possible, the actual movements by which all these axes and wheels effect the process of computation; but, when we state that the drawings of the various parts, constructed by, or under, Mr. Babbage, cover one thousand square feet of surface, and that the machine is one of the most complicated assemblage of parts that the hand of man has ever devised, it is obvious that we must not attempt such a task. Suffice it to say, that every kind of mechanical agent is brought more or less into effect: cog-wheels, ratchet-wheels, bolts, teeth, claws, racks, levers, wedges, screws,—all are employed; and in such vast number, that none but persons accustomed to inspect machinery can avoid being bewildered by their enumeration.

Perhaps the most extraordinary part of the machine is, that it prints the tables as fast as it calculates them. When one of the dial-wheels is in such a position as to indicate any particular figure of the table, some mechanism at the back raises a curved arm, containing several figure-punches. A plate of copper is brought near the bent arm, and, by a sudden blow, an impression of the required figure is punched in the copper; and the figure so punched always corresponds with that indicated on the dial. The plate is shifted from place to place, until it is punched all over with figures arranged in a tabular form. The plate thus stamped may be either used as an engraved copper-plate, and printed from in that form; or may be used as a mould, from whence stereotyped plates may be produced.

When Mr. Babbage had advanced some way in the construction of a model-machine, and had ascertained that the principle on which he was proceeding was capable of effecting the desired object, the subject was taken up by government, and made a national concern, on the ground that no private individual could reap from such an invention a return adequate to the necessary outlay; and on the ground, also, that government were desirous of affording to the navy all possible means of obtaining correct tables for the computation of latitude, longitude, &c. The government applied to the Royal Society to report on the degree of progress which Mr. Babbage had made, and on the probability of the machine, when completed, effecting all that had been anticipated from it. The report was very favourable, conveying the opinion of the scientific men composing the committee of inquiry, that the proposed end was desirable; that it was attainable on the plan adopted by Mr. Babbage; and that that gentleman was fully equal to the task of carrying it out.

We have spoken of the machine as if it were completed, or, at least, as it is intended to be completed. But, in fact, it is not yet in operation, nor even near completion. More than twenty years have elapsed since the first commencement of the model, during the whole of which time new difficulties have occurred, and have been conquered one by one. Still, however, the machine is not completed, and we are not exactly aware what are the causes of the long delay;—whether it results wholly from the unprecedented difficulties of the undertaking, or whether pecuniary difficulties have retarded the progress; but every lover of astronomy, of navigation, or of general science, must ardently desire the completion of so noble a specimen of genius and perseverance. We believe that the machine, so far as it is yet constructed, is national property; and that Mr. Babbage has neither received, nor desires to receive, any pecuniary benefit from the invention. If this be really the case, it is difficult to conceive a more honourable position than that which the inventor must occupy in the estimation of all to whom the well-being of society, and its advancement in knowledge, is a desirable object.

BROCADE.

Some o'er her lap their careful plumes display'd,
Trembling, and conscious of the rich brocade.

In the early part of the last century a favourite but costly stuff for dresses was formed of gold, silver and silken threads, enriched with flowered ornaments of the same materials: this was called *brocade*. At the present day, however, all stuffs, grograms, satins, taffetas, and lustrings are called brocades, if they are adorned with flowers or other figures.

In the preparation of gold brocade many ingenious devices have been resorted to for diminishing the costliness of the article, by employing as small a quantity as possible of the precious metals. In the preparation of the threads for the brocade, a flattened silver-gilt wire or riband was spun on silk which had been previously dyed as near as possible of a gold colour; and the chief merit in preparing gold threads was so to regulate the convolutions of the metallic covering of the silk, that its edges should be in close contact and form a continuous casing without any overlapping or interstices.

In all manufactures a great demand for an article is a sufficient stimulus to ingenious persons to contrive the very best possible methods for its production; and accordingly, we find that at the time when gold brocade was much in request, the manufacture of the thread, upon which branch much of the brocade depended, was in a state of great excellence, and some manufacturers were so jealous of their skill as to keep their processes strictly secret. Among others, there existed at Milan a large manufactory, where by a secret process, flattened wire, gilt on one side only, was made. Nuremburg, the great toy-shop of Europe, furnished an inferior description of thread, made by spinning gilt copper wire on flaxen or hempen threads. The economical Chinese employed slips of gilt-paper twisted upon silk:—sometimes they even twisted the paper without any internal support, into long spiral rolls and introduced it into their dresses. But as these golden tissues were by no means permanent when worn about the person, the Chinese confined their use chiefly to the tapestries and internal decorations of their houses.

About the thirteenth century a very flourishing manufacture of brocades existed at Lucca; but in the year 1310 the artisans being oppressed by the government, fled to Venice, where they were encouraged to resume their trade, and for a long period they continued to carry it on with considerable success.

The Venetians invented a new form of brocade which they named *damasquitte*. Although it contained no more than half the quantity of gold and silver usually employed in making brocade, yet its appearance was far more costly and beautiful. The flattened wires were not placed so closely together on the silk threads, and the number of these threads in weaving was diminished. But the great secret of the economy seems to consist in passing the manufactured stuffs in a peculiar manner between rollers with great pressure, so as to partially crush the wire threads; by this means the ornamental pattern appeared like one entire brilliant surface of gold or silver.

This process was long kept a secret; but about the middle of the last century the spirit of commercial rivalry prompted the French Government to attempt a similar manufacture. In this attempt they were assisted by M. Vaucanson, so celelebrated for his automatic achievements, who erected machinery at Lyons, and presented an account of his proceedings to the French Academy in the year 1757.

The rollers employed by M. Vaucanson were, the upper one of wood, and the lower one of copper, the latter being made hollow, for the insertion of iron heaters. In the early attempts it was found that the united force

of ten men was scarce.y sufficient so to work the rollers as to extend the plating of the wire threads; and the great amount of force so deranged the machinery in which the rollers were placed, that the effects of pressure on the cloth were always varying. Among many other inconveniences, the wooden rollers were constantly splitting or warping, in consequence of the mode of forcing the rollers together. M. Vaucanson, therefore, contrived a method whereby the pressure should always adjust itself to any inequalities in the stuff, or in the bearings of the machine. The axis of the copper roller he made to turn between anti-friction rollers, while the wooden roller was forced upwards by levers at the ends. Each lever had its short arm supported on the frame of the machine, and the long arm was drawn up by an iron rod communicating with the short arm of a horizontal lever, to which at its long arm was hung a weight; and these levers were so proportioned that thirty pounds only would produce a pressure between the rollers equal to 17,000 or 18,000 pounds. This force was found sufficient, and it was so effectual that the efforts of four men in turning the rollers answered the purpose better than ten men in the former case.

The copper roller was heated by the insertion of four red-hot iron bars. After two or three pieces of cloth had been rolled, a fresh wooden roller was employed, since the heat, if long continued, was sure to split it. The heated wooden roller was wrapped, as soon as it was removed, in cloths, and placed in an atmosphere from which it might acquire moisture. The heat and pressure thus employed to extend the gilding were found greatly to improve the brilliancy of white and yellow silks, but to impair that of crimson, green, and other colours.

It will be seen, from what we have already stated, that brocade was a very costly article of dress; not only from the amount of precious metal employed, and the tedious and expensive mode of manufacture, but also from its evanescent nature. A brocade dress was very liable to become tarnished; when such was the case, the mode of washing was also costly. A soft brush, dipped in warm spirits of wine, is said to be the only method of restoring tarnished brocade. Brocade powders were in vogue at the time this sumptuous dress was in fashion, but they were ineffectual, because, from the extreme thinness of the metal, it was easily scratched or worn away by the friction even of the most impalpable powder.

Brocade continued to be used in ornamenting drawing-room furniture, long after it had ceased to adorn the persons of beaux and belles. In 1798 some brocade chair-bottoms, for Carlton House, were produced at Spitalfields, and are said to be still in existence. There is no doubt that should the vane of that weathercock, Fashion, again point out gold and silver brocade as a desirable article of attire, our modern manufactures would soon equal, if not surpass, the costliest productions of former days. To those who are anxious for such a result let us recommend the remarks of the *Spectator*, which, though written a hundred and thirty years ago, are still applicable, because they refer to one of the weaknesses of human nature.

A furbelow of precious stones, a hat buttoned with a diamond, a brocade waistcoat or gown, are standing topics of conversation. In short, they only consider the drapery of the species, and never cast away a thought on those ornaments of the mind, that make persons illustrious in themselves and useful to others. When persons are thus perpetually dazzling one another's imaginations, and filling their heads with nothing but colours, it is no wonder that they are more attentive to the superficial parts of life than the solid and substantial blessings of it.

The love of novelty often leads us from old established favourites to less interesting objects; and when Fashion points the way, we follow as if this tyrant directress were incapable of error.—Phillips.

POISONOUS ARTICLES OF FOOD.

I.

MUSHROOMS.

Many hundred species of the *Agaricus*, or mushroom, are enumerated by botanists, as being distributed over nearly the whole of Europe, and great part of Asia, Africa, and America. Of these, the people of this country esteem but three as eatable, but the inhabitants of various parts of the Continent make use of a much greater number, and it is said that in the Tuscan markets not less than three hundred different species are offered for sale. Almost all writers agree in considering mushrooms as very difficult of digestion, and hence an improper article of diet, and it is certain that the most wholesome kinds will sometimes produce, in those not accustomed to them, symptoms of indigestion, of a most distressing, and often alarming kind.

Dr. Christison and others believe that they may be rendered less unwholesome by more attention being paid to the cookery than is usual, but, as every medical opinion must have its opposite, Dr. Schwœgnöchen, of Leipzig, declares they are only innocent when eaten raw, and states, as a proof thereof, that during his botanical excursions he has always been accustomed to diet himself like the peasants, viz., upon crude mushrooms and bread, and, so far from finding them disagree with him, he has always on these occasions gained flesh. Pallas states also that the inhabitants of many districts of Asiatic Russia live almost exclusively during Lent on bread and fungi, which they eat almost indiscriminately, and without evil consequences. Mushrooms formed a favourite dish among the ancient epicures, and frequent mention is made of them by Horace, Juvenal, and Martial.

Dr. Greville enumerates twenty-six species, growing abundantly in various parts of Great Britain, most of which are considered as eatable abroad. We, however, reject all but three, as dangerous or poisonous: these are, 1, *Agaricus campestris*, the common mushroom, so well known by its fragrant odour, and button-like form, when young; 2, *Agaricus Georgii*, which sometimes reaches an immense size; 3, *Agaricus pratensis*, or Scotch bonnet, occurring in the patches termed fairy rings. It is very possible by this limitation we may reject several kinds which might be safely eaten, yet is such an error much safer than the too indiscriminate use of this vegetable on the Continent, for the French medical journals record no less than one hundred deaths from eating mushrooms, as occurring in the vicinity of Paris, during the space of thirty years, viz., between 1749 and 1783. Severe epidemics have been also sometimes traced to the same source. It has been sometimes attempted to explain the deaths arising from eating mushrooms, as depending upon some peculiarity, or idiosyncracy, as it is termed, in the individuals affected, which disposes them to be injuriously affected by articles of diet, which in their general operations are harmless, or even beneficial, to others; or again, it has been supposed that the mushrooms may have become mingled with some poisonous matter, by being cooked in copper vessels. Undoubtedly, both these causes may have produced injurious, or even fatal effects, in some cases, but an immense number of experiments and observations have proved beyond doubt, that a truly poisonous substance, (the nature of which is however not known,) is contained in several species of mushrooms. As a proof, however, either that some constitutional peculiarities sometimes influence the operation of this vegetable upon the system, or that climate and situation modify its properties, we may mention that the *Agaricus piperitis*, or pepper mushroom, which is thought by us to be very hurtful, is largely consumed in Russia. The *Agaricus muscarius*, the red, or bug (so called from its destroying this animal) mushroom, which is deemed

rankly poisonous in Britain, is used by the Russians and Kamschadales for the purposes of intoxication. Dr. Langsdorff says the Asiatic Russians, who call it *muchomoree*, use it dry in the form of pills, and that one large, or two small mushrooms are enough for a day's debauch. In an hour or two the same symptoms which with us follow taking wine manifest themselves, and a surprising degree of muscular activity and energy is developed for a while. The Koriacks use it as a tonic for invalids, much as we do wine.

That mushrooms were occasionally poisonous, was well known in ancient times, and the writings of the Greek, Roman, and Arabian physicians, contain many cautions and precepts upon the subject. They have even been criminally given in order to produce this effect, and thus Agrippina, the mother of Nero, is said to have poisoned Claudius by their means, to accelerate the succession of her son, who called them "food for the gods," and frequently had recourse to them for similar purposes, during his iniquitous reign. The instances of accidental poisoning in modern times are unfortunately but too frequent. The symptoms are often five or six hours before they manifest themselves, even fifteen or twenty-four have sometimes elapsed: the fatal substance having undergone the process of digestion, and mingled with and corrupted all the juices of the body, before exhibiting any external signs of its presence: these even are often obscure and unintelligible at first; an irrepressible propensity to laughter and general exhiliration, usually herald in the vomiting, griping, and diarrhœa; then follow sooner or later, fainting, stupefaction, and death. The effects of the poison are as slow in their progress as in their onset, and the patient may linger days before the fatal moment arrives. The musician, Schobert, and his family, together with a friend and a physician, having partook of a dish of mushrooms, gathered near Paris, were all poisoned. Mr. Brande has related the case of a man who gathered some small mushrooms in the Green Park, the *Agaricus semi-globatus* of Withering, and *Agaricus glutinosus* of Curtis. Himself, wife, and four children, were all severely affected, but by the use of appropriate measures recovered. Mr. Parrot relates also the case of a family of six, who supped on stewed mushrooms: the father and mother eventually recovered after a severe illness, but three of the children were carried off after lingering a few days. The noxious species of mushrooms are equally hurtful to man as to animals, and no kind of culinary treatment seems to deprive them of their dangerous properties. A very small admixture of a bad with a good species suffices to produce ill effects.

In regard to the treatment of persons poisoned by mushrooms, or indeed by any other description of deleterious food, it cannot be too generally known that the prompt administration of an emetic is the best remedy. This may consist of a spoonful or two of mustard, or a scruple of sulphate of zinc, mixed with water. As the poison of the mushroom is so slow in its operations, the use of the emetic will often be attended with the happiest results. The subsequent treatment of the case will depend upon many circumstances, of which we need give no account, as it should only be undertaken under the superintendence of a professional man.

An important and difficult point has properly occupied the attention of many observers, viz., the signs by which we can distinguish the dangerous from the innocent species of mushroom. The botanical definitions are very minute, yet not sufficiently directed to this point, while the sensible differences between the esculent and the noxious kinds depend sometimes upon such shades of distinction, as to be quite inappreciable by those little accustomed to such investigations. Nevertheless, some facts, gathered from practical observation, have been accumulated, which render considerable assistance to the enquirer.

Miller thus describes the common mushroom:—"When young it appears of a roundish form, smooth like a button, which with its stalk is white, especially the fleshy part of the button: the gills within, when broken, are livid. As it grows larger, it expands its head by degrees into a flat form: the gills are at first of a pale flesh colour, but become blackish by standing."

Professor Orfila says,—"All those growing in moist and marshy grounds, in the shade, as in forests, must be rejected as bad; they are always found too soft, porous, and moist, and have a dirty disagreeable appearance. Those which change colour when cut, have a strong pungent odour, or are of a shining or varied colour, are dangerous; so are those which insects have bitten and left, or which have bulbous or soft stems, or fragments of skin glued to their surface. Those of very rapid growth and decay are bad. Although many are said to lose their poisonous properties when dried, this observation will apply only to some species."

A recent writer upon the subject states, that all mushrooms having the following characters are poisonous: 1st, when the cap is very thin in proportion to the gills; 2nd, when the stalk grows from one side of the cap; 3rd, when the gills are of equal length; 4th, when a milky juice is present; 5th, those which soon run into a dark watery liquid; 6th, when the collar surrounding the stalk is thready, or resembling a spider's web.

De Candolle declares that all kinds may be eaten, with the exception of the following:—1st, coriaceous or ligneous kinds; 2nd, those which have collars in their stems; 3rd, those which have an acrid taste; 4th, those which turn blue on being cut.

Dr. Greville recommends collectors to taste all they gather, and to reject those which produce an acrid or astringent sensation, as also those which have a pungent or disagreeable smell. The importance and difficulty of this point may be judged of by the circumstance of some of the continental nations having found it necessary to pass formal decrees upon the subject. Thus it has been ordered in Austria, that the inspector of the market must produce proof of having attended lectures upon the subject, and familiarized himself with the botanical distinctions of the various species of mushrooms, while works upon the same topic, must be in the possession of the magistrate. Similar decrees were issued in France in the time of Napoleon.

INFANTILE POEM,

WRITTEN FOR LORD HASTINGS' CHILDREN BY LADY FLORA HASTINGS.

GET up, little sister, the morning is bright,
And the birds are all singing to welcome the light;
The buds are all opening—the dew's on the flower!
If you shake but a branch, see there falls quite a shower.

By the side of their mothers, look, under the trees,
How the young fawns are skipping about as they please;
And by all those rings on the water, I know
The fishes are merrily swimming below.

The bee, I dare say, has been long on the wing,
To get honey from every flower of the spring;
For the bee never idles, but labours all day,
And thinks, wise little insect, work better than play.

The lark's singing gaily; it loves the bright sun,
And rejoices that now the gay spring is begun;
For the spring is so cheerful, I think 'twould be wrong
If we did not feel happy to hear the lark's song.

G t up, for when all things are merry and glad,
G od children should never be lazy and sad;
For God gives us daylight, dear sister, that we
May rejoice like the lark, and may work like the bee.

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